



Watermain Replacement and Connection Procedure

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TS 7.70.01 SCOPE

The work involves the procedure for making watermain replacement and connection to an existing watermain system. All work shall be done to the satisfaction of the Contract Administrator. Instructions for making a connection are based on the scenarios in Figure 1 and Figure 2.

TS 7.70.02 NEW WATERMAIN SYSTEM

- 1** Pressure test, flush, and chlorinate new watermain. Pressure testing and chlorination of new watermains will be in isolation from the existing water distribution system.
- 2** Service connections larger than 50 mm in diameter will be terminated as close as possible to the street line. The service connection will be pressure tested, flushed, chlorinated and water sampled as part of the watermain system.
- 3** Contractor will use a portable field test kit to check for residual chlorine and turbidity. If the sample passes, then the two consecutive sampling procedures can begin.
 - The residual chlorine should be better or equivalent to the source sample.
 - Turbidity should be less than < 1 nephelometric turbidity units (NTU). Technical Services Contract Administrator to discuss with Toronto Water operations representative to accept if non-health related.
- 4** Take two consecutive samples at sampling stations S1, S2, S3, S4 and S5 as shown on Figure 1 and according to TS 7.30 *Procedure for Disinfecting Watermains*.
- 5** If samples pass at all five sampling stations, then the new watermain can be connected to the existing watermains.
- 6** All valves which are part of the isolated section of new watermain shall remain closed until Toronto Water's bacteriological sample from the filler spool piece has passed. The Toronto Water supervisor will notify the Contract Administrator with an e-mail message that the sample results indicate a pass. Valving is scheduled and Toronto Water can then begin to open the valves.
- 7** The new watermain pipe permitted to be dewatered is from the isolation valve on the new watermain to the connection point on the existing watermain which shall be less than 6.1 m.
- 8** Contractor starts reconnecting existing water services from the existing live watermain to the new isolated watermain.

TS 7.70.03**CONNECTING TO BRANCH CONNECTIONS**

The following is a typical procedure for the connection of a replacement watermain to an existing watermain on street B as shown of Figure 1.

- 1** Contractor will close valves V_3, V_2 and V_4 and restrain valve V_3 to ensure the valve does not blow-off.
- 2** Toronto Water to close valves V_C, V_D and V_J on the existing watermain system.
- 3** Toronto Water to open fire hydrant on street B so as to depressurize existing watermain system.
- 4** Close hydrant isolation valve to ensure water from hydrant lead does not flow back into watermain pipe. Remove valve V_E or keep in place in a closed position. Pump out water to keep water level in excavation below existing pipe. If valve V_E was kept in place, open valve after permanent connection is complete, and break down one metre below subgrade and abandon in place.
- 5** Valve V_3 is to remain closed. Ensure valve is properly restrained and remove blow-off.
- 6** Manually swab and disinfect filler piece which makes up pipe B if length is less than 6.1 m.
- 7** If length of filler piece is greater than 6.1 m, then standard disinfection methods apply.
- 8** Install filler piece of watermain pipe.
- 9** Contractor to install 19 millimetres corporation stop and copper sampling pipe to grade with blow-off on watermain pipe on the dead side of valve V_3.
- 10** Open valves V_2 and V_4.
- 11** Valves V_C, V_D and V_J to remain in the closed position.
- 12** Toronto Water to open fire hydrant on street B.
- 13** Toronto Water to open valve V_3 and flush main in one direction through fire hydrant on street B.
- 14** Toronto Water to close valve V_3 and open valve V_J and flush through same fire hydrant on street B.
- 15** Toronto Water to take a water sample from copper sampling pipe. Sample must first pass before contractor proceeds with removal of 19 mm copper sampling pipe and backfilling of access pit.

Since the existing watermain on street B is dewatered, it is a requirement for Toronto Water staff to collect a water sample for bacteriological analysis. Toronto Water will be able to collect a sample at Step 15 to satisfy their regulatory requirement for testing the existing water on street B. Using a fire hydrant as a sampling point is not acceptable.

Toronto Water staff will collect the sample while the excavation is open and notify the Technical Services contract administrator whether the water sample results passed. Toronto Water to advise Technical Services when to proceed with the removal of the 19 mm copper sampling pipe and backfilling of the access pit.

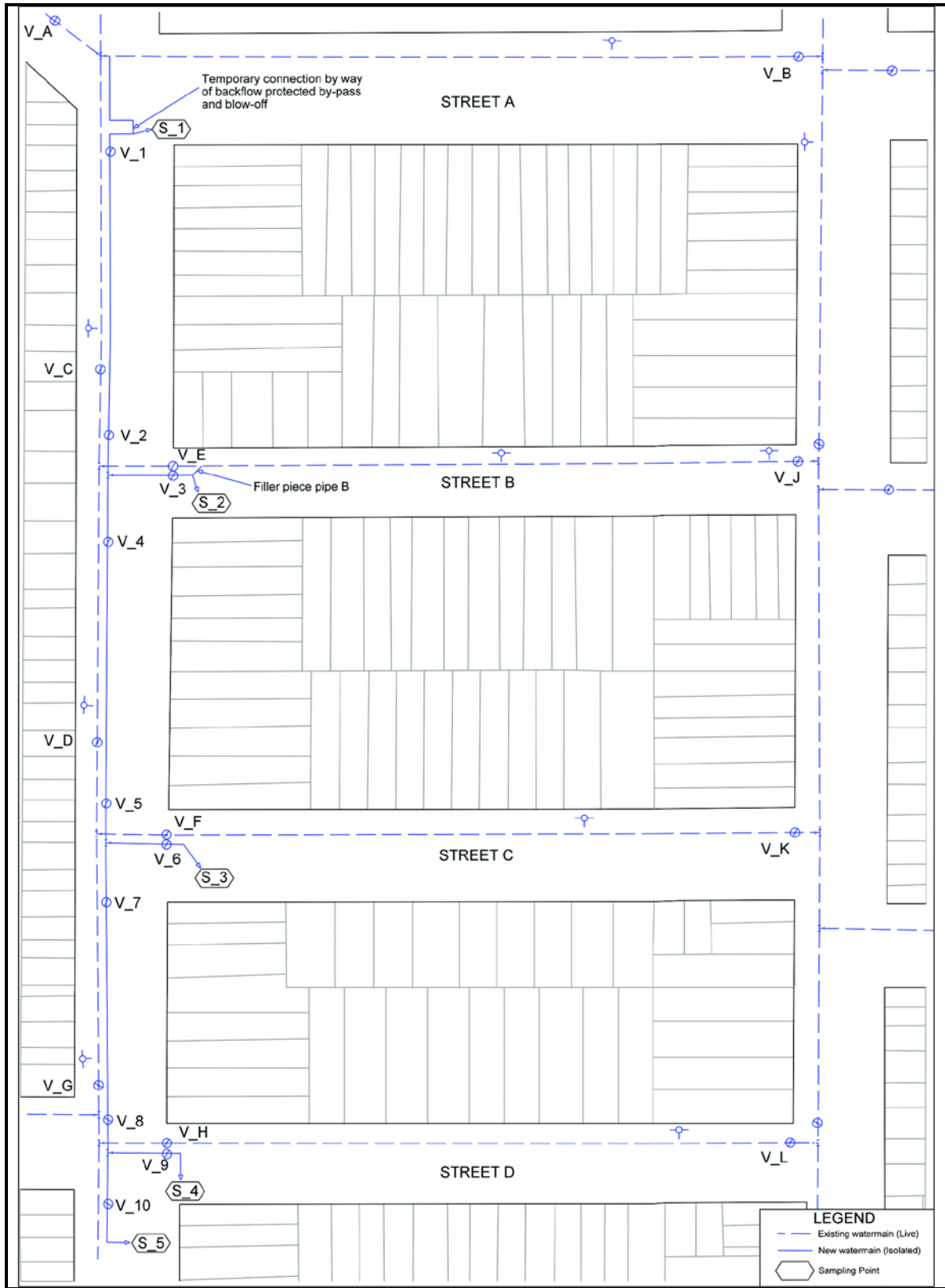


Figure 1: Scenario one – connecting to branch connections

TS 7.70.04**CONNECTING TO SOURCE FEEDER WATERMAIN**

Procedure for connecting new watermain system to existing watermain system. For this example the connection will be for a permanent connection on street A as shown in Figure 2.

- 1 Toronto Water staff to close valves V_A, V_B and V_C on the existing watermain system.
- 2 Contractor to close valve V_1 only on new watermain system. The contractor may need to close valve V_2 and release pressure in the main by partially opening valve V_1 and blowing off through the temporary bypass and blow-off to avoid blowing out valve V_1 if there is insufficient installed pipe lengths between valve V_1 and the connection. Also ensure valve V_1 is properly restrained to avoid blowing-out and injuring a worker should valve V_2 fail.
- 3 Depressurize existing watermain through fire hydrant on street A. If there is no fire hydrant between the valves, tapping in a blow-off on the existing watermain may be necessary.
- 4 Remove temporary by-pass connection.
- 5 Cut into the existing pipe on street A and remove the old tee and replace with a suitable length of pipe.
- 6 Cut into the existing pipe on street A space for the new tee which will be connected to the new watermain.
- 7 Pump out excess water from trench.
- 8 Remove old section of watermain pipe marked "A" and discard off-site.
- 9 Manually swab and disinfect filler pieces of watermains
- 10 If length of filler piece is greater than 6.1 m, then standard disinfection methods apply.
- 11 Install filler piece.
- 12 Contractor to install 19 mm corporation stop and copper sampling pipe to grade.
- 13 Toronto Water to open fire hydrant on street A.
- 14 Toronto Water to open valve V_A and flush main in one direction.
- 15 Toronto Water to close valve V_A and open valve V_B and flush main in one direction through hydrant on street A.
- 16 Toronto Water to take a water sample from copper sampling pipe. Sample must first pass before contractor proceeds with removal of 19 mm copper sampling pipe and backfilling of access pit.
- 17 Toronto Water to open valve V_1.

Since the existing watermain on street A is dewatered, it is a requirement for Toronto Water to collect water samples for bacteriological analysis. Toronto Water will be able to collect a water sample at Step 16 to satisfy their regulatory requirement for testing the water on street A and in the filler piece. Using a fire hydrant as a sampling point will not be acceptable.

Note 1: Toronto Water staff will collect the sample while the excavation is open and notify the Technical Services contract administrator whether water sample results passed. Toronto Water to advise Technical Services when to proceed with removal of 19 mm copper sampling pipe and backfilling of the access pit.

Note 2: As a good practice, valves V_A and V_1 should remain closed while valve V_B is left open until acceptable disinfection results are obtained. If there are any existing water services between valves V_A to V_1 or V_B to V_1 or both, the valves should remain closed except for valve V_B until acceptable disinfection test results are confirmed. Only open more than one valve at an intersection, if there is a water supply issue for the area.

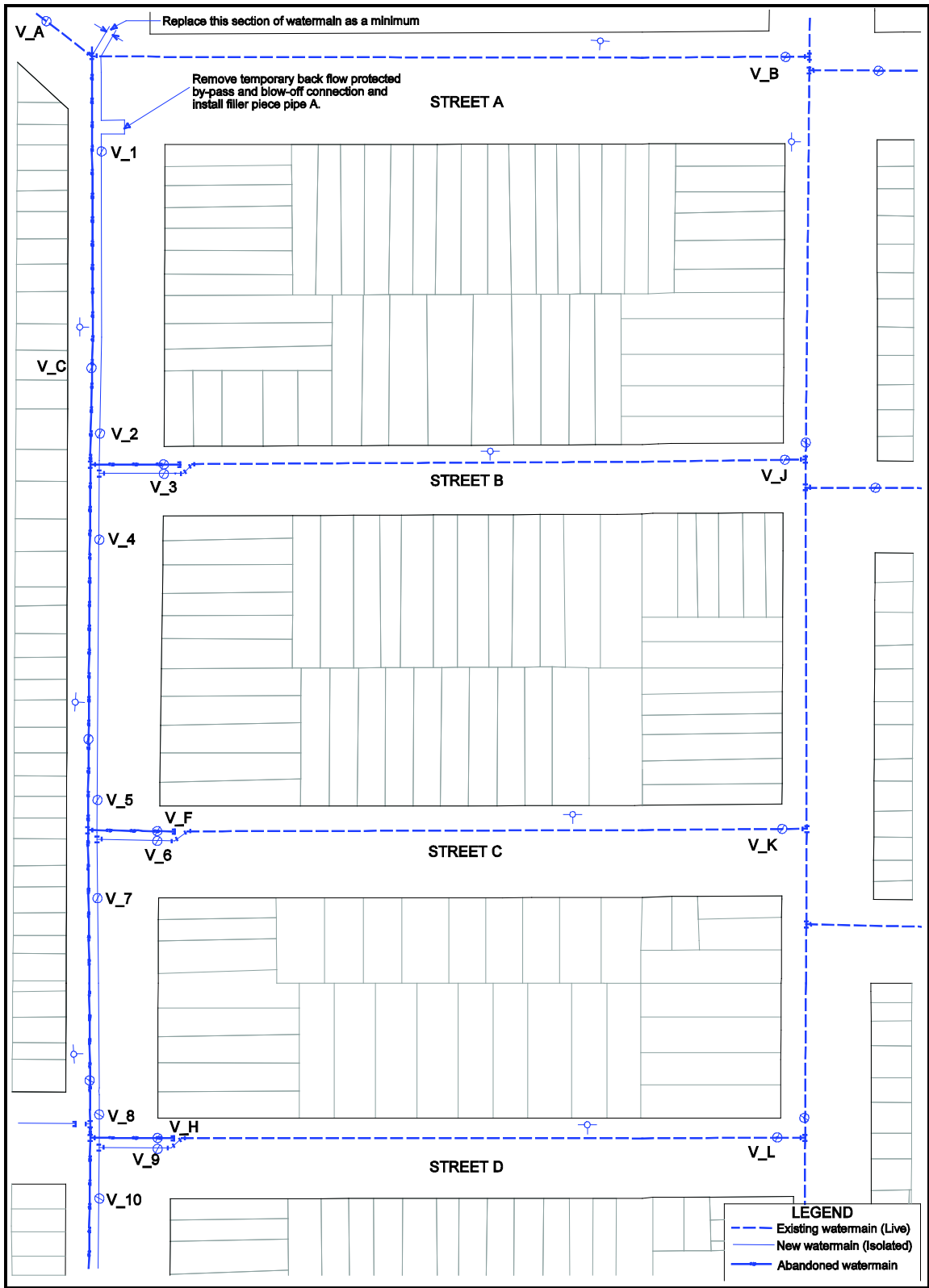


Figure 2: Scenario two – connecting to source feeder watermain